

Chapter 6

Future Investment

Strategy

***Resilient Rhody 2025* Future Investment Strategy**

***Resilient Rhody 2025* identifies 79 actions and ten priority Climate Adaptation & Resilience Solutions that constitute the most urgent and high-impact interventions needed to protect Rhode Island's assets, residents, and natural resources.** This document provides a statewide strategy to advance these resilience actions and solutions by summarizing funding needs, identifying legislative requirements, and outlining specific funding pathways for each of the 79 actions and the ten priority solutions.

In addition to outlining the steps the State can take to advance the 79 actions and 10 solutions, this document provides actionable strategies within a Funding Strategy Framework to help state and local partners identify and prioritize projects, navigate available funding opportunities, and coordinate effective implementation beyond the scope of this plan.

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Introduction

The analysis and recommendations presented in this strategy were developed through a structured, multi-step methodology based on quantitative assessment, qualitative review, and alignment with statewide climate and resilience goals.

Resilient Rhody 2025 Actions

The *Resilient Rhody 2025* Actions set ambitious goals to strengthen resilience across systems statewide. Instead of specifying individual construction projects or physical solutions, these actions **focus on programmatic priorities** across state agencies and entities and establishing metrics to track progress.

Understanding funding requirements is critical to advancing these actions. Each action includes an estimated funding need, developed through targeted research using cost ranges derived from prior state capital plans, comparable adaptation initiatives, and national benchmarks.

These estimates account for different implementation scales, from supporting small pilot initiatives serving specific communities to comprehensive statewide programs. Some action items require sustained, multi-year investment. However, not all actions will receive the same level of funding or follow the same schedule in each cycle. In these cases, funding ranges represent a single cycle's allocation with the duration of that cycle (ex. annual, bi-annual, etc.) noted where available. Inflation adjustments have not been applied due to the preliminary nature of the Actions and the lack of sufficient detail to support accurate projections.

Each proposed action was also evaluated and assigned one or more

Implementation Framework Tags to classify the type of governance or policy needs required in order for the actions to be successful. Tags were assigned based on the nature of the intervention, such as whether it required regulatory changes, cross-agency coordination, or new funding mechanisms.

Each Action includes the following information:

Action 14.01

State Resilience Action Tracking: Refine the tracking system for state resilience actions identified in this plan to continuously measure progress and demonstrate alignment with EC4 climate resilience goals. Make sure tracking includes agency ownership, defined timelines, and regular progress updates through the EC4 and Resilience EC4 Subgroup.

Building upon the structure of the 2024 State of Resilience Report and Resilience EC4 Subgroup, continue to grow a coordinated, publicly-accessible mechanism to share progress, foster collaboration across agencies, and build coalitions across sectors and communities.

Category:

Infrastructure Island Systems Community Resilience Emergency Preparedness

Asset Type:

All Critical Infrastructure	Drinking Water	Wastewater	Dams	Stormwater
Ports	Recreation	Fuel Supply	Energy, Storage, & Carbon	Public Transportation
Seawater & Brackish	Coastal Wetlands	Ferries	Water Resources	
Evacuation Routes & Emergency Shelters	Building Design & Construction	Emergency Services	Community Health & Resilience	Emergency Climate Resilience Tracking

1 Responsibility: RIDEM, Resilience EC4 Subgroup

2 Driver: State, Local Analysis, Community, Federal, Municipal

3 Timeframe: Short-Term (1-2 years), Medium-Term (3-5 years), Long-Term (Ongoing)

4 Metrics for Success: A coordinated, publicly-accessible tracking system to measure and share progress of State resilience actions is refined and made publicly accessible.

5 Implementation Need(s): Intergovernmental Coordination, Collection & Information Systems, Education, Engagement & Awareness

6 Potential Funding Source: National Coastal Resilience Fund (NCRF)

7 Funding Need: N/A, \$, \$5, \$50, \$500

- 1. Responsibility**
Indicates the lead or partner entities responsible for the action.
- 2. Action Driver**
Identifies the stakeholder group(s) that initiated, influenced, or recommended the action.
- 3. Timeframe**
Indicates short-term, medium-term, or long-term/ongoing actions.
- 4. Metrics for Success**
Indicators of success to measure progress towards the action against.
- 5. Implementation Need(s)**
Indicates policy or legislative needs necessary to implement the action. These are categorized into four groups: Funding, Policy & Compliance, Tools & Training, & Coordination needs.
- 6. Potential Funding Source:**
Indicates potential funding sources ranging from federal, state, local, and innovative mechanisms.
- 7. Funding Need**
Indicates the relative funding amounts necessary to carry forward the action. N/A indicates actions focused on advocacy, efficiency, or priority setting.

*One can reference the specific funding needs, potential funding sources, and implementation needs recommended for each action in Chapter 2: Resilient Rhody 2025 Actions.

Climate Adaptation & Resilience Solutions

In addition to the *Resilient Rhody 2025* Actions, **physical infrastructure improvements** are required to increase Rhode Island's resilience to climate hazards. This Strategy details the recommended Funding Approach, primary funding mechanisms for the following Climate Adaptation & Resilience Solutions:

- Road & Bridge Flood Mitigation Solutions with a focus on evacuation routes
- Resilient Port Infrastructure Solutions
- Energy Resilience Solutions with a focus on Washington County and Block Island
- Sewer & Stormwater Infrastructure Solutions
- Wastewater Treatment Facilities Hardening
- Drinking Water & Reservoir Resilience
- Beach & Wetland System Restoration
- River and Stream Restoration with a focus on the Moshassuck River
- School & Public Safety Building Solutions with hardening and relocation opportunities
- Hospital Flood & Energy Resilience Solutions

This includes identifying the most appropriate federal programs, complementary state funding sources, match requirements, optimal sequencing from planning through construction, permitting and engineering dependencies, and the appropriate role of state agencies in advancing implementation.

Each of the ten solutions includes specific strategy guidance, accompanying costs estimates and a targeted funding strategy:

Drinking Water & Reservoir Resilience Strategies

The strategies work together to provide resilience strategies for both coastal and inland reservoirs. All reservoirs should consider elevating their embankment to minimize flood risk. Coastal reservoirs need to be particularly concerned about saltwater intrusion, the temporary or permanent barriers to their existing emergency spill discharge plans. Inegrated watershed-scale planning offers an opportunity to safeguard drinking water supplies. For example, the Big River flow protected watershed lands can be strategically managed for sources.

Community Voices

"Concerned about existing water facilities located near shorelines, (because) salt intrusion [is] becoming an issue with rising sea levels."

Implement Watershed Management and Heat Red

Effective watershed management to conserve and restore vegetated riparian buffers reduces the amount of nitrogen and phosphorus loads to reservoirs. When combined with rising temperatures, these chemicals can cause algal blooms in reservoirs. By reducing contaminants riparian buffers can reduce increased algal growth due to extreme heat. Water conservation strategies, such as xeriscaping and using summer rainwater, can also be a strategy to deal with summer water shortages.

Enhance Existing Emergency Spillway

Coastal reservoirs should consider existing emergency spillways by installing additional barriers to protect from surface water overflow. If feasible, a temporary barrier (often 12" to 18" high) can be installed but this is not a long-term solution. For a more permanent barrier, hydraulic gates can also be implemented on a case-by-case basis. Hydraulic gates can be used to regulate the flow of water in a river and create the water quality a not impacted significantly. Gates will not protect against whether infiltration via groundwater, which primarily impacts wells drawing upon aquifers. Groundwater salt intrusion would need to be addressed through desalination, well relocation, or other methods.

Benefits

Drinking water infrastructure is directly tied to public health, both quality and quantity of water is needed to maintain statewide health. Floods threaten the quality of drinking water, since runoff may be a pathway for additional nitrates, contamination. The solutions reduce the amount of untreated runoff to reservoirs, and the desalination plant helps make saltwater potable. Similarly, extreme heat may bring increased algal growth, however, effective watershed reduction reduces chemical inputs that drive algal blooms, protecting the quality of the water. Reservoirs are also ecosystems, so the solutions help further enhance habitats and biodiversity.

Economic Impacts

Protecting drinking water infrastructure safeguards public health and economic stability. Rhode Island's coastal areas are many of the state's population centers and have many businesses, operations and recreational activities. Resilience investments create jobs in watershed management and engineering, and water quality monitoring. Preventing contamination avoids costly treatment upgrades and emergency water supply expenses. Clean, reliable water supplies attract businesses, support property values, and enable economic development. Catchment management and infrastructure improvements reduce long-term operational costs while ensuring the water security essential for sustained economic activity and population health.

Consequence of Inaction

The consequence of inaction on Rhode Island's drinking water and reservoir systems is high. Investing in resilience measures often cost-effectiveness by creating an important access to safe water during emergency events. While infrastructure costs vary, proactive solution strategies are less costly than the consequences of failure in contrast. Failure to act exposes Rhode Island communities to public health risks, emergency expenditures, and long-term infrastructure damage.

Funding Strategy

The proposed solutions align closely with the identified funding programs. Funding sources can cover infrastructure upgrades that protect drinking water quality, including embankment reinforcement, spillway modifications, and reservoir management planning. While others complement these efforts by supporting nature-based and watershed strategies that reduce runoff, prevent saltwater intrusion, and improve resilience to extreme weather. These programs collectively support both the engineered and ecological components of reservoir resilience.

Mechanism Title: Drinking Water State Revolving Fund (DWSRF)

Mechanism Type: Loan/Grant

Level: Federal

Agency: Rhode Island Infrastructure Bank (RIIB) & RDCH

Mechanism Title: NOAA Coastal Resilience Grants

Mechanism Type: Grants

Level: Federal

Agency: National Oceanic and Atmospheric Administration

State Role: Provide guidance on project eligibility, support and technical assistance for preliminary engineering reports, and help identify regional partners (watershed groups, NOAA, university) to support cooperative applications. Support development of any needed watershed relation studies.

Next Steps: Develop a concept proposal and identify partners for collaborative application.

Note: The Funding Strategy outlines two potential mechanisms for implementing project solutions; however, it does not represent a comprehensive list of all available funding options. For a complete overview, please refer to the future investment strategy.

*Detailed funding strategies are also included for each of the ten priority Climate Adaptation & Resilience Solutions outlined in Chapter 5: Climate Adaptation & Resilience Solutions.

Funding Strategy Framework

In addition to the detailed funding strategies for the ten priority solutions, a broader funding strategy framework was developed to guide state and local planners in creating actionable funding pathways for other assets prioritized in the future. This Strategy provides a roadmap to support state and local climate leaders to systematically evaluate and advance other Climate Adaptation & Resilience Solutions beyond this plan. Specifically, it provides guidance on how to:

- Step 1: Apply the Asset Prioritization Framework Criteria to Vulnerable Assets
- Step 2: Apply the Project Prioritization Framework to Priority Assets
- Step 3: Match High-Priority Projects to Available Funding Mechanisms
- Step 4: Define the State's Specific Support Role for Each Project

This structured process is designed to enable planners to prioritize additional assets, identify appropriate funding sources, and sequence key actions from planning through implementation. It also clarifies the enabling role of state agencies in providing data, coordination, and technical assistance, while ensuring that funding decisions promote equitable access to resilience investments across Rhode Island communities.

Qualification

Funding needs outlined in this document are provided for informational purposes only based on review of existing precedents and previous budgets. Actual funding needs for the Actions described herein will vary based on numerous factors, including but not limited to scope definition, project-specific risks, delivery methods, stakeholder engagement, funding mechanisms, timeframes, and existing operations. Arup does not guarantee that actual funding requirements for the Actions outlined will match the figures provided in this document or other related deliverables.

Executive Summary

Resilient Rhody 2025 Actions

The *Resilient Rhody 2025 Actions* establish bold, cross-agency goals for strengthening resilience across systems statewide. These actions define programmatic priorities and set funding and planning metrics to measure success.

The total estimated funding needed to achieve the *Resilient Rhody 2025 Actions* is \$121M - \$304M.

The funding requirements span multiple categories, including supporting funding mechanisms, resilient infrastructure programs and initiatives, planning and coordination activities, data and mapping, workforce development and capacity building, and updating standards and codes.

Rhode Island Department of Environmental Management (RIDEM) is associated with the largest number of actions (nine) and the widest estimated funding range, from \$12 million to \$81 million.

Joint leadership between CRMC and RIDEM accounts for an additional five actions with estimated funding needs of \$7 million to \$14 million, underscoring the importance of coordinated coastal and environmental management efforts.

Funding, Technical Assistance & Capacity Building are the most cited implementation needs to achieve the *Resilient Rhody 2025 Actions*.

Climate Adaptation & Resilience Solutions

In addition to the *Resilient Rhody 2025 Actions*, physical infrastructure improvements are required to increase Rhode Island's resilience. This Strategy details the recommended funding approach, primary funding mechanisms, and State role for 10 solutions.

To implement the Actions outlined in this report, additional funding will be essential for design and construction of physical projects. Two assessments, State Benchmarking and Solution Benchmarking, have been completed to establish a baseline for scaling this need. The State benchmarking analysis incorporates budget allocation trends from neighboring and peer states, contextualizing the scale and structure of resilience investments across the region. These insights are intended to support future funding decisions.

Massachusetts has adopted a structured approach to resilience funding by establishing a statutory framework that sets a goal of allocating one percent of its state budget to environmental and climate-related initiatives, including resilience. **If Rhode Island adopted a similar allocation model, the State could advance adaptation and resilience solutions across its highest risk assets.**

Funding Strategy Framework

This Strategy provides a roadmap to support state and local climate leaders systematically evaluate and advance other Climate Adaptation & Resilience Solutions beyond this plan. This includes the guidance on how to:

- Step 1:** Apply the Asset Prioritization Framework Criteria to Vulnerable Assets
- Step 2:** Apply the Project Prioritization Framework to Priority Assets
- Step 3:** Match High-Priority Projects to Available Funding Mechanisms
- Step 4:** Define the State's Specific Support Role for Each Project

1. Resilient Rhody 2025 Actions

1a - Resilient Rhody 2025 Actions Funding Needs

1b - Resilient Rhody 2025 Actions Implementation Needs

Resilient Rhody 2025 Actions

The *Resilient Rhody 2025 Actions* establish bold, cross-agency goals for strengthening resilience across systems statewide. Rather than prescribing specific construction projects or built solutions, these actions focus on establishing programmatic priorities as well as funding and planning metrics to measure success.

This Plan outlines **79 Actions**

- **38 actions** focus on infrastructure asset types, addressing climate risks to critical systems.
- **14 actions** target natural systems, emphasizing preservation and restoration of vulnerable habitats.
- **18 actions** strengthen community resilience, including new measures to address health impacts of climate hazards and expand financing for resilience solutions.
- **9 actions** enhance emergency preparedness, streamlining response procedures and improving coordination.

Asset Type	Number of Actions
Critical Infrastructure	38
Statewide Resilience: All Critical Systems	14
Drinking Water	4
Wastewater	3
Dams	1
Stormwater Infrastructure	3
Ports	2
Electric Grid	4
Fuel Supply	2
Roads, Bridges, and Culverts	3
Public Transportation	2
Natural Systems	14
Beaches and Barriers	5
Coastal Wetlands	3
Forests	4
Water Resources	2
Community Resilience	18
Community Health & Resilience	10
Resilience Funding	5
Cross Sector Resilience	3
Emergency Preparedness	9
Building Design and Construction	3
Evacuation Routes & Emergency Shelters	2
Emergency Services	4

1a - Resilient Rhody 2025 Actions Funding Needs

The *Resilient Rhody 2025 Actions Funding Needs* estimates reflect a range of implementation scales, from pilot initiatives to comprehensive, statewide programs. These estimates are preliminary and will require further refinement as actions advance through scoping, program design, and implementation planning.

It is important to note that these funding estimates do not represent the full construction costs associated with large-scale capital or infrastructure projects.¹ Instead, the Action-level funding needs focus on establishing the programs, policies, coordination structures, data systems, and institutional capacity necessary to enable successful implementation. Inflation adjustments have not been applied due to the preliminary nature of these actions and the lack of sufficient detail for accurate projections.

Funding Schedule Classification

To summarize funding needs across the 79 *Resilient Rhody 2025* Actions, each action was classified into one of the following funding schedule types:

- **Annual-FTE Funding:** Actions that require the creation of new positions or the ongoing support of staff capacity.
- **NA:** Actions that can be achieved without additional funding, such as continuing partnerships, research, and learning from peer regions (e.g., Action 14.02, which focuses on learning from and maintaining collaborative partnerships with neighboring states).
- **One-Time:** Actions that require a single expenditure to complete a defined task, such as updating a specific plan or procedure.
- **Large-Scale Capital:** Actions that involve multiple, construction-focused projects (e.g., dam hardening or port upgrades) and require project-level cost estimation.*
- **Ongoing:** Actions that require sustained funding over time to remain effective. The recurrence timing and funding levels will vary based on the nature of the activity and Rhode Island’s evolving priorities. Not all actions will receive the same level of funding or follow the same schedule in each cycle.

Funding Schedule Type Summary (All Actions)

Funding Schedule Type	Number of Actions
Annual-FTE Funding	6
NA	6
One-Time	10
Ongoing	45
Large-Scale Capital	12
Total	79

*Actions that call for multiple, construction-focused infrastructure improvement projects are excluded from the total funding needs calculation.

Actions Included in Total Funding Needs Calculation

Actions classified as NA or Large-Scale Capital were excluded from the total funding needs calculation below because funding is either negligible (NA) or they require project-specific construction cost analysis (Large-Scale Capital), which will significantly influence the Action's total funding needs depending on the scope and number of projects pursued.² Relevant Action pages include notes acknowledging when significant additional investment is required, when further cost estimates are needed, and when distinctions must be made between physical installation costs and broader capacity costs.³

61 actions primarily focus on establishing the supporting programs and initiatives needed to advance resilience goals.

Funding Schedule Type Summary (Included Actions)

Funding Schedule Type	Number of Actions	Estimated Funding Range
Annual-FTE Funding	6	\$2M - \$5M
One-Time	10	\$4M - \$11M
Ongoing	45	\$115M - \$288M
Total	61	\$121M - \$304M

Key Drivers of Funding Ranges

Several large-scale actions drive the upper end of the funding range, particularly those with significant startup costs. For example, Action 12.04 calls for extensive resource mapping, including the acquisition and use of high-resolution LiDAR data and other advanced conservation planning tools, which require substantial upfront investment.

At the same time, many actions involve lower-cost planning, coordination, and policy development activities that can generate significant resilience benefits by strengthening existing institutional frameworks and expanding implementation capacity.

For actions classified as ongoing, startup costs are often higher than long-term operating costs. Accordingly, the upper-bound total funding needs estimate of approximately \$305 million reflects the level of investment needed during early implementation years, when programs are being launched or significantly expanded. In contrast, the lower-bound total funding needs estimate, estimated at approximately \$120 million, more closely reflects the funding required to maintain the actions once programs and supporting systems are established.

² Action with NA funding needs: 6.01, 10.01, 14.02, 14.06, 15.01, 20.01

³ Many of these Actions are marked with “\$\$\$\$” on their respective pages in Chapter 2: *Resilient Rhody 2025* Actions either because they require per-project cost estimates and/or involve the establishment or continuation of a funding mechanisms including Actions 1.01, 3.01, 4.02, 4.03, 5.02, 6.02, 6.03, 6.04, 7.01, 8.01, 9.02, 10.04, 11.03, 15.03, 17.02, 19.03, 19.04, and 20.02.

Funding Needs by Responsible Entity

The table below summarizes estimated funding requirements by the primary agency or organization responsible for implementing the *Resilient Rhody 2025* Actions. Estimates reflect high-level, preliminary cost ranges associated with establishing programs, coordination mechanisms, data systems, and, where applicable, enabling infrastructure investment programs.

Responsible Entity	Number of Actions	Estimated Funding Range
RIDEM	9	\$12M - \$81M
CRMC, RIDEM	5	\$7M - \$14M
CRMC, RIEMA, RIDEM	3	\$0.75M - \$2M
RIDEM, Resilience EC4 Subgroup	3	\$1M - \$3M
Div. of Statewide Planning	2	\$0.5M - \$1M
DPUC, PUC, OER, and Utilities	2	\$6M - \$15M
WRB, RIDOH	2	\$6M - \$15M
RIDEM, WRB	1	\$1M - \$5M
RIEMA, RIDEM, RI Div. of Statewide Planning	1	\$10M - \$15M
Commerce	1	\$15M - \$20M
RIIB, RIDEM	1	\$5M - \$10M
RIDOH, EOHHS	1	\$0.5M - \$1M
OER	1	\$5M - \$10M
RIIB	1	\$10M - \$15M
RIEMA	1	\$0.5M - \$1M
Other State Agencies/Partnerships	27	\$41M - \$96M
Total	61	\$121M - \$304M

The Rhode Island Department of Environmental Management (RIDEM) is associated with the largest number of actions (eight) and the widest estimated funding range, from \$12 million to \$81 million.⁴ Joint leadership between CRMC and RIDEM accounts for an additional five actions with estimated funding needs of \$7 million to \$14 million, underscoring the importance of coordinated coastal and environmental management efforts.

RIDEM is associated with the highest number of actions (9), with an estimated funding need ranging from \$12 million to \$81 million.

Several multi-agency partnerships including CRMC, RIEMA, and RIDEM, as well as RIDEM and the Resilience EC4 Subgroup are each responsible for three actions, with funding needs generally ranging from \$0.75 million to \$3 million, reflecting more targeted or programmatic interventions.

A broad group of Other State Agencies and Partnerships collectively account for the largest share of actions (27), with combined estimated funding needs of \$41 million to \$96 million, highlighting the cross-government nature of resilience implementation and the importance of coordinated funding strategies across multiple implementing entities.

⁴ Note that Upper-bound funding estimates are more reflective of startup and early implementation costs, whereas lower-bound estimates more closely represent ongoing maintenance and sustained programmatic support.

Funding Needs by Asset Type

The *Resilient Rhody 2025* Actions build resilience through a combination of strategies that strengthen planning, coordination, and implementation across asset types. Many actions are geared towards data-driven assessment and reporting, ensuring that assessments, like dam and evacuation routes, are current and accessible through centralized platforms. Additionally, actions promote greater standardization and alignment by embedding resilience into codes and design parameters for assets. Collaboration is another key theme of the actions, leveraging partnerships with neighboring states, universities, and professional organizations to share expertise and resources for specific asset types. The following table summarizes estimated funding requirements for these actions by the primary asset or system addressed:

Asset Type	Number of Actions	Estimated Funding Range
All Critical Infrastructure	11	\$5M - \$17M
Community Health and Resilience	11	\$11M - \$31M
Financing Climate Resilience Projects	7	\$21M - \$42M
Forests	4	\$8M - \$65M
Coastal Wetlands	4	\$6M - \$13M
Drinking Water	4	\$8M - \$25M
Roads, Bridges, and Culverts	3	\$17M - \$26M
Emergency Services	3	\$6M - \$11M
Wastewater	2	\$1M - \$5M
Stormwater	2	\$10M - \$16M
Building Design and Construction	2	\$10M - \$15M
Electric Grids	2	\$10M - \$20M
Public Transportation	1	\$0.5M - \$1M
Ports ⁵	1	\$0.25M - \$0.5M
Fuel Supply	1	\$5M - \$10M
Beaches and Barriers	1	\$0.25M - \$0.5M
Water Resources	1	\$0.5M - \$1M
Evacuation Routes and Emergency Shelters	1	\$1M - \$5M
Total	61	\$121M - \$304M

Outstanding Actions that require significant Large-Scale Capital investments for implementation are not included in the totals above. Among the *included* Actions, forest-related programs and initiatives represent the largest anticipated investment category, with funding needs ranging from \$8 million to \$65 million.⁶ Financing Climate Resilience Projects also carries a substantial funding requirement (\$21 million to \$41 million), underscoring the importance of financing tools

⁵ The funding amount under Ports is related Action 5.01 which calls for partnership support and a statewide port economic vulnerability study. Larger port infrastructure projects are covered under action 5.02 and are on a per-project basis.

⁶ This range is reflective of the high cost associated with establishing a new, high-tech mapping platform as indicated by a stakeholder during this Plan's review process.

and mechanisms that enable and sustain implementation across multiple asset types. Community Health and Resilience actions represent another major investment area, with funding needs estimated at \$11 million to \$31 million, reflecting the broad set of interventions needed to protect vulnerable populations and strengthen local capacity.

1b - Resilient Rhody 2025 Actions Implementation Needs

The review of proposed *Resilient Rhody 2025* Actions demonstrates a strong need for legislative and policy interventions that support improved coordination, data systems, and community capacity that are necessary to achieve the *Resilient Rhody 2025* Actions. **Therefore, an Implementation Framework was developed to outline the necessary supporting steps required to transition each Action into execution.** The full list of tags is defined on the following page.

Funding, Technical Assistance & Capacity Building

are the most cited implementation needs to achieve the *Resilient Rhody 2025* Actions

The most cited implementation needs are for Funding and Technical Assistance & Capacity Building, underscoring the need for dedicated legislative support to expand access to workforce training and technical guidance, particularly for under-resourced communities.

Several actions call for **Data Collection & Information Systems**, reflecting the importance of standardized monitoring, data sharing, and performance tracking to guide effective decision-making across agencies and jurisdictions. **Rules and Regulations** were cited for actions involving infrastructure standards and emergency preparedness, indicating the need for updated regulatory frameworks to mandate or incentivize climate-resilient practices.

There is also a recurring emphasis on Education, Engagement, & Awareness, suggesting a need for policies and funding that support public outreach, stakeholder engagement, and technical education around climate impacts and solutions. Finally, several actions directly cite **Funding as a standalone policy need**, highlighting a legislative gap in financing mechanisms for critical infrastructure and community resilience programs.

Using the Implementation Needs Analysis

The Implementation Needs analysis is intended to inform the design and sequencing of funding strategies by identifying the policy, programming, and governance supports required to advance the *Resilient Rhody 2025* Actions. Each action may be associated with multiple implementation tags, recognizing that effective implementation often requires a combination of enabling strategies. Collectively, the results clarify how foundational investments such as capacity building, data infrastructure, coordination frameworks, or policy and regulatory development interact with and support capital and program funding, helping guide funding alignment, sequencing, and prioritization across actions and agencies.

Implementation Framework Tags

The tags were established to help communicate the type of implementation support and enabling governance required. Below are the tags used, with explanations for each designation. Additional details and examples of tags are included in Appendix A: Implementation Framework Tags Descriptions.

Category	Implementation Needs Tags	Description
Funding	Funding	Funding required to develop new programming (state grant programs, planning initiatives, etc.) or invest in resilience actions, including operating and capital funding sources and public financing mechanisms that make resources available.
	Community Incentives	Programs or policy tools that encourage voluntary resilience actions by residents, businesses, or property owners (e.g., tax abatements, rebate programs).
	Direct Government Investment & Procurement	Deployment of public funds through government-led capital investments, infrastructure projects, or procurement policies that model or deliver climate-resilient practices.
Policy & Compliance	Land Use Policy	Changes to zoning, building codes, or land use planning needed to support resilient development, open space preservation, or managed retreat.
	Rules & Regulations	Regulatory updates needed to remove barriers or mandate climate-resilient practices.
	Enforcement & Compliance Mechanisms	Creating oversight systems, inspection protocols, penalties, or compliance monitoring for existing or new climate resilience requirements.
Tools & Training	Data Collection & Information Systems	Creating requirements for data gathering, standardized reporting, monitoring systems, or information sharing platforms that support resilience decision-making across sectors.
	Technical Assistance & Capacity Building	Establishing government programs and staff to provide technical expertise, professional development, or direct support services to help communities, businesses, or other agencies implement resilience measures.
	Education, Engagement, & Awareness	Public education campaigns, K-12 curriculum additions, technical training, non formal educational opportunities, or stakeholder engagement efforts required to build support or understanding of climate resilience.
Coordination	Intergovernmental Coordination	Establishing formal mechanisms for collaboration between state, federal, and local governments, including interstate compacts, regional authorities, or mandated coordination protocols for climate resilience planning.
	Public-Private Partnership Frameworks	Establishing legal structures and policies that facilitate collaboration between government and private sector for resilience investments, risk-sharing arrangements, or innovative financing mechanisms.
	Emergency Preparedness & Response Authorities	Developing special governmental authorities for climate emergencies, including streamlined permitting during disasters, emergency procurement powers, or evacuation/relocation authorities.

Implementation Needs by Action Category

The following analysis briefly summarizes the alignment between the action categories and the implementation needs. Each action could receive more than one implementation tag, acknowledging that multiple implementation needs may be relevant for any given action. For example, 14 actions in the Infrastructure category will require technical assistance and capacity building in order to achieve the desired outcome.

The following table summarizes Implementation Needs by Asset Category:

Implementation Needs Tags	Asset Categories				Total
	Community Resilience	Emergency Preparedness	Infrastructure	Natural Systems	
Funding	10	1	16	2	29
Technical Assistance & Capacity Building	7	2	14	5	28
Data Collection & Information Systems	2	1	15	7	25
Intergovernmental Coordination	3	1	15	5	24
Rules & Regulations	2	-	14	4	20
Education, Engagement, & Awareness	5	3	6	2	16
Emergency Preparedness & Response Authorities	1	4	8	1	14
Community Incentives	1	-	1	6	8
Land Use Policy	1	-	6	-	7
Public-Private Partnership Frameworks	3	-	2	2	7
Direct Government Investment & Procurement	3	-	2	1	6
Enforcement & Compliance Mechanisms	-	-	4	1	5
Total	38	12	103	36	189

Community Resilience Actions — The leading implementation need for actions in the Community Resilience category was Funding, emphasizing the importance of legislative support to ensure adequate financial resources for community-based adaptation efforts.

Emergency Preparedness Actions — The leading implementation need for Emergency Preparedness actions was Emergency Preparedness & Response Authorities. This includes the need for support in contingency planning, interconnection protocols, and rapid deployment and mitigation efforts.

Infrastructure Actions — The infrastructure actions category identified Funding, Data Collection & Information Systems, Intergovernmental Coordination, Technical Assistance & Capacity Building, and Rules & Regulations as the top implementation needs. This highlights the level of cooperation, planning, and complexity required to improve infrastructure resilience.

Natural Systems — The leading implementation need for Natural Systems actions was for Data Collection & Information Systems. This underscores the importance of improved environmental monitoring, standardized reporting, and information sharing to guide conservation and land management efforts.

The leading implementation need(s) for each asset category are:

- Community Resilience Actions: **Funding**
- Emergency Preparedness Actions: **Emergency Preparedness & Response Authorities**
- Infrastructure Actions: **Funding, Data Collection & Information Systems, Intergovernmental Coordination, Technical Assistance & Capacity Building, and Rules & Regulations**
- Natural Systems Actions: **Data Collection & Information Systems**

Implementation Needs by Responsible Entity

The following table summarizes the number of legislative and policy interventions needed by the primary agency or organization responsible for implementation:

Agency/Organization Leader	Number of Tags
CRMC, RIDEM	22
RIDEM	22
RIDEM, Resilience EC4 Subgroup	13
CRMC, RIEMA, RIDEM	8
WRB, RIDOH	7
CRMC	6
RIDEM, WRB	5
RIDEM, OER	4
Commerce, RI Div. of Statewide Planning, RIIB	4
Div. of Statewide Planning	4
RIDOT	4
CRMC, RIDEM, URI	4
DPUC, PUC, OER, and Utilities	4
RIEMA, RI Div. of Statewide Planning	4
RIDE, RIDOH, RIIB	4
RIDEM, RIEMA	4
RIPTA, RIDOT, RI Div. of Statewide Planning	3
RIEMA, RIDEM, RI Div. of Statewide Planning	3
RIEMA	3
WRB, RIDOH, RIEMA	3
RIEMA, RIDOT, RI Div. of Statewide Planning	3
OER, RIEMA, DPUC	3
State Building Commission, RIEMA, CRMC, RIDEM, RIWARN	3
RIDEM (NBNERR), CRMC	3
RIDOT, RIDEM	3
RIDOH, EOHHS, RIDEM	2
RIIB	2
Other State Agencies/Partnerships	39

RIDEM (22) and the joint leadership pairing of CRMC and RIDEM each have the highest number of Implementation Needs tags (22), indicating that these entities will need to employ a broad set of approaches to advance the Resilient Rhody 2025 Actions. RIDEM, in partnership with the Resilience EC4 Subgroup, follows with 13 tags, reflecting a similarly wide-ranging implementation role that will require multiple policy, regulatory, and programmatic tools. Additional multi-agency leadership groups—including CRMC, RIEMA, and RIDEM—are associated with eight tags, underscoring the importance of coordination across agencies for a subset of actions.

Organizations and partnerships with fewer tags generally oversee more focused responsibilities and will likely be able to rely on narrower, more targeted strategies to accomplish their assigned actions. Collectively, the remaining state agencies and partnerships account for approximately 39 tags, highlighting the broad, cross-government nature of resilience implementation in Rhode Island.

2. Climate Adaptation & Resilience Solutions

2a - How States are Funding Adaptation and Resilience Solutions

2b - Climate Adaptation & Resilience Solutions Funding Needs

2c - Climate Adaptation & Resilience Solutions Implementation Strategy

2a - How States are Funding Adaptation and Resilience Solutions

In addition to implementing the *Resilient Rhody 2025* Actions, Rhode Island must undertake physical infrastructure improvements to enhance climate resilience. To inform the state's funding strategy, an analysis of budget allocations in neighboring and peer states provides essential context regarding the scale and structure of resilience investments in the region. This comparative review considers states that share similar coastal vulnerabilities including Massachusetts, Connecticut, Maryland, Maine, and Delaware. The population and distance of shoreline are included for relative scale. Please refer to Appendix B for more information about each state's programming.

Massachusetts has adopted a structured approach to resilience funding by establishing a statutory framework that sets a goal of allocating one percent of its state budget to environmental and climate-related initiatives, including resilience. **If Rhode Island adopted a similar allocation model, the State could advance adaptation and resilience solutions across its highest risk assets.**

State	Population	Shoreline	Significant Investments in Climate
Massachusetts	~7.0M	~1,500 miles	~\$547M annually (Targeting 1% of \$60.9 billion FY2026 state budget) ; Municipal Vulnerability Preparedness Action Grants \$52.4M (Aug 2024); Disaster Relief Fund \$25M
Connecticut	~3.6M	~620 miles	Department of Energy and Environmental Protection (DEEP) Climate Resilience Fund \$44.8M FY2025 (\$33M state, \$11.8M federal) ; \$25M FY2024 + \$22.5M FY2025 for dam/flood/erosion repair; \$275M Clean Water Fund bonds
Maryland	~6.2M	~3,200 miles	\$29M Chesapeake & Atlantic Coastal Bays Trust Fund (FY2026) ; \$24M Waterway Capital Appropriation; \$97M DNR Watershed & Climate Services; \$15.2M NOAA Climate-Ready Coasts
Maine	~1.4M	~3,500 miles	\$8M Community Resilience Partnership (May 2025) ; \$60M post-storm rebuilding ; \$69M NOAA Challenge (2024-2029);
Delaware	~1.1M	~380 miles	\$15M state-funded coastal shoreline resilience initiative (Oct 2024)
Rhode Island	~1.1M	~400 miles	\$7.6M Across 12 Municipal Resiliency Program Grants in FY25, \$2M Resilient Rhody Infrastructure Fund Loans, \$100.5M FY25 Clean Water Loans, \$34M FY25 Drinking Water Loans*⁷

⁷ Rhode Island Infrastructure Bank Annual Report 2025

The funding allocations detailed above represent identifiable climate resilience line items from each state's budget and publicly announced grant programs. These figures likely do not capture the full scope of climate-related investments these states are making, as resilience funding is often embedded within broader infrastructure, environmental, public health, and emergency management appropriations that serve multiple purposes. For example, transportation projects may include climate adaptation components, water infrastructure investments may address both aging systems and climate resilience, and emergency management budgets may support both disaster response and climate preparedness. Despite these limitations, the identified investments provide a meaningful baseline for comparison with Rhode Island's efforts, illustrating the scale, structure, and strategic approaches that neighboring and peer states have adopted to address coastal climate risks.

Highlighted State Investment Scale and Strategy

Massachusetts has adopted a structured approach to resilience funding by establishing a statutory framework that sets a goal of allocating one percent of its state budget to environmental and climate-related initiatives, including resilience. Based on the state's enacted FY2026 \$60.9 billion budget, a commitment representing approximately \$547 million was made for programs addressing resilience, environmental health, and watershed protection. The FY2026 budget also includes a dedicated line item of \$5 million for "Climate Adaptation and Preparedness." This approach is supported by Massachusetts General Laws Chapter 30, Section 61, which requires state agencies to evaluate and implement measures to minimize environmental damage, including impacts from climate change such as sea-level rise.

If Rhode Island adopted a similar allocation model, the State could advance adaptation and resilience solutions across its highest risk assets.

2b - Climate Adaptation & Resilience Solutions Funding Needs

Ten priority adaptation and resilience solutions have been identified, designed, and costed to address the most urgent risks to transportation, coastal, energy, water, natural, and community assets. These solutions directly respond to vulnerabilities revealed through the Statewide Climate Vulnerability Assessment and are intended to strengthen critical infrastructure and safeguard essential systems.

These comprise:

- Road & Bridge Flood Mitigation Solutions with a focus on evacuation routes
- Resilient Port Infrastructure Solutions
- Energy Resilience Solutions with a focus on Washington County and Block Island
- Sewer & Stormwater Infrastructure Solutions
- Wastewater Treatment Facilities Hardening
- Drinking Water & Reservoir Resilience
- Beach & Wetland System Restoration
- River and Stream Restoration with a focus on the Moshassuck River
- School & Public Safety Building Solutions with hardening and relocation opportunities
- Hospital Flood & Energy Resilience Solutions

The strategies, their supporting cost estimates, and specific funding strategies are available in Chapter 5: Climate Adaptation & Resilience Solutions.

This section outlines the estimated funding needed if the State were to advance one representative project for each of the ten developed and costed Climate Adaptation & Resilience Solutions.

The following table provides:

- Number of priority assets associated with each solution
- Number or percentage of assessed assets rated *High* or *Very High* for the relevant hazard
- Representative project selected for cost estimation
- Estimated cost of that representative project

A complete list of priority assets can be found in Chapter 4: Priority Assets List, and cost estimates for all explored strategies are provided in Chapter 5: Climate Adaptation & Resilience Solutions.

The table is designed to illustrate the relative scale of investment for different strategies by presenting benchmark costs from previous projects. These representative project costs illustrate the rough-order-of-magnitude scale of the capital costs for real projects that are corollary to projects that might be undertaken as part of resilience interventions proposed in this report.

Project costs are reported based on the date of reporting and project location. These project costs are also normalized to Rhode Island and 2026 dollars for reference. The normalization process used the following methodology:

- Escalated project costs to 2025 dollars using Construction Cost Indices from Engineering News Record (ENR).

- Normalized project costs to Rhode Island location basis using 2025 City Cost Indices from RSMeans. Normalized project costs to Rhode Island location basis using 2025 City Cost Indices from RSMeans.

The information in this table, in conjunction with the range of costs included for specific strategies in Chapter 5, enables the State to approximate the potential funding required, based on the scope and number of projects considered feasible for implementation. For planning purposes, this table should be used alongside the State allocation comparison outlined above to ensure funding is scaled appropriately and realistically.

Capital construction and/or implementation costs for future projects in Rhode Island will vary based on a variety of factors including but not limited to defined extent of scope, project-specific risks, site constraints, environmental scope, construction delivery method, stakeholder engagement, funding mechanisms, existing asset operations and potential downtime, and/or market factors.

Solution Type	Number of Priority Assets and High & Very High Risk Assets under the most extreme scenario	Representative Project for Cost Comparison	Project Cost	Normalized Project Cost
Road & Bridge Flood Mitigation Solutions with a focus on evacuation routes	<p>3 Priority Corridors</p> <p>18% of assessed evacuation routes with H/VH Coastal Flooding Risk</p> <p>15% of assessed evacuation routes with H/VH Riverine Flooding Risk</p> <p>368 /1,179 of assessed bridges with H/VH Coastal Flooding Risk</p> <p>578/1,179 of assessed bridges with H/VH Riverine Flooding Risk</p>	<p>Merrick Road (New York State Route 27A) Culvert Replacement, Road Raising & Reconstruction, Long Island, NY (2025)</p> <p>Replace culvert w/wider culvert, raise roadway above 100-year flood elevation (~2' at lowest point) and reconstruct roadway (new shoulders, sidewalks, bike accommodations, barriers), traffic management & two-way temporary road access through duration of construction for 3,900 linear feet extents.</p>	\$11.7M	\$10.0M
Resilient Port Infrastructure Solutions	<p>2 Priority Assets</p> <p>813/1568 of assessed port assets with H/VH Coastal Flooding Risk</p>	<p>Galilee North Facility – Bulkhead and Pier Repairs, Narragansett, RI (2019)</p> <p>Remove and reconstruct ten (10) piers; rehabilitate 2,200 linear feet of bulkhead (filling areas of subsidence, sheet pile patching, repaving, and installation of fender piles to protect the deteriorated sheet pile wall)</p>	\$5.2M	\$6.4M
Energy Resilience Solutions with a focus on Washington County and Block Island	<p>2 Priority Areas</p> <p>~330/885 miles of assessed electrical transmission lines with H/VH risk to Extreme Wind (2050, RCP 8.5)</p>	<p>Susquehanna-Roseland Electric Reliability Project, Susquehanna, PA – Roseland, NJ (2015)</p> <p>Install a 150-mile, 500-kV transmission line</p>	\$1.4B	\$2.1B
Sewer & Stormwater Infrastructure Solutions	<p>6 Priority Areas</p> <p>13% of assessed stormwater infrastructure assets with H/VH Coastal Flooding Risk</p>	<p>City of Pawtucket Green Infrastructure Installation - Pine Street, Pawtucket, RI (2022)</p> <p>Construct pretreatment structures, seven (7) planters, and permeable pavers along a 600-ft stretch of road</p>	\$1.1M	\$1.1M
Wastewater Treatment Facilities Hardening	<p>6 Priority Assets</p> <p>13/19 of assessed wastewater treatment facilities with H/VH Coastal Flooding Risk</p> <p>19/19 of assessed wastewater treatment facilities with H/VH Stormwater Flooding Risk</p> <p>5/19 of assessed wastewater treatment facilities with H/VH Riverine Flooding Risk</p>	<p>East Providence Wastewater Treatment Facility, East Providence, RI (2013)</p> <p>Upgrade 8.9-mgd wastewater system by relocating interceptor, improving aeration, clarifiers, odor control, pump stations, etc., and increasing pumping capacity</p>	\$51M	\$70M

<p>Drinking Water & Reservoir Resilience</p>	<p>6 Priority Assets 4/49 of assessed public drinking water reservoirs with H/VH Coastal Flooding Risk 29/49 of assessed public drinking water reservoirs with H/VH Riverine Flooding Risk</p>	<p>North & South Easton Pond Dams Resiliency Project, Newport, RI (2022) Raise and/or armor 9,050 feet of embankments, widen primary spillway from 100'x4.5' to 120'x7', add hydraulic gate and control building, add automatic one-way tidal/flap gate</p>	<p>\$43M</p>	<p>\$46M</p>
<p>Beach & Wetland System Restoration</p>	<p>5 Priority Areas 37/134 of assessed coastal barriers with H/VH Coastal Flooding Risk 99% of assessed coastal wetlands with H/VH Coastal Flooding Risk</p>	<p>St. Johns County Ponte Vedra Beach Restoration Project, Jacksonville, FL (2024) Dredge about 9 miles of coastline (more than 2M CY of sand), fortify coastline by reconstructing dunes between 13 and 18 feet and berms of 8 feet and increasing beach width from 40 to 180 feet</p>	<p>\$39M</p>	<p>\$47M</p>
<p>River and Stream Restoration with a focus on the Moshassuck River</p>	<p>1 Priority River 10% of assessed rivers and streams with H/VH Coastal Flooding Risk ~100% of assessed rivers and streams with V/VH Stormwater Flooding Risk ~100% of assessed rivers and streams with V/VH Extreme Heat Flood Risk</p>	<p>Maidford River Restoration Project, Middletown, RI (2022) Lower floodplain, construct new meandering channel (120-250ft wide, 150-390ft long, 45-95ft radius of curvature), replant riverbanks and disturbed floodplain areas with native vegetation</p>	<p>\$2.0M</p>	<p>\$2.1M</p>
<p>School & Public Safety Building Solutions with hardening and relocation opportunities</p>	<p>12 Priority Assets 46/ 552 of assessed Pre-K-12 Schools with H/VH Coastal Flooding Risk 59/552 of assessed Pre-K-12 Schools with H/VH Riverine Flooding Risk 21/241 of assessed Public Safety Buildings with H/VH Coastal Flooding Risk 24/241 of assessed Public Safety Buildings with H/VH Riverine Flooding Risk</p>	<p>Olneyville Resilience Hub, Providence, RI (2024) Construct a resilience hub with an approximate footprint of 3400-sqft</p>	<p>\$8.3M</p>	<p>\$8.5M</p>
<p>Hospital Flood & Energy Resilience Solutions</p>	<p>3 Priority Assets 3/17 assessed Hospitals with H/VH Coastal Flooding Risk 3/17 assessed Hospitals with H/VH Riverine Flooding Risk All assessed Hospitals have H/VH Extreme Heat and Stormwater Flooding Risk</p>	<p>Tampa General Hospital, Tampa, FL (2024) Design and install an Aqua Fence designed to hold back 15ft storm surge, 9ft high wall, 1000LF, elevate equipment, seal openings Kaiser Permanente Microgrid Installation, Oakland, CA (2025) 2 MW of on-site solar power canopy energy generation (installed by Ameresco under a power purchase agreement with Kaiser Permanent) & 9 MWhr of battery storage capacity (funded through an \$8.3 million grant from the California Energy Commission to Faraday Microgrids).</p>	<p>\$1.0M \$8.3M</p>	<p>\$1.2M \$7.0M</p>

2c - Climate Adaptation & Resilience Solutions Implementation Strategies

Because these solutions will require complex coordination, substantial capital investment, and consistent state leadership to advance, each demands a tailored, actionable funding strategy rather than a one-size-fits-all approach.

The funding strategies presented below translate the State's broader investment framework—including federal and state funding mechanisms, legislative requirements, equity considerations, and the Prioritization Framework outlined herein— into solution-specific pathways.

While the strategies focus on primary funding mechanisms most directly aligned with each solution, they are not intended to be exhaustive. In practice, implementation will often draw on a broader mix of supplemental and project-specific funding sources, including agency operating funds, formula programs, philanthropic or nonprofit contributions, private investment, utility capital budgets, and smaller state or federal grant programs. For example, stream restoration and riparian buffer projects are often supported through a combination of BWRP, EPA Nonpoint Source (Section 319) funds, and Narragansett Bay Estuary Program (NBEP) grants, including resources for project scoping, feasibility, and partnership-based planning. Additional funding sources outside of the primary mechanisms may play a critical role in advancing early planning, piloting, gap financing, or long-term operations and maintenance.

Each strategy outlines the most viable funding or financing tools that can strengthen competitiveness or meet match requirements, and the optimal sequencing of planning, engineering, and construction activities. Funding sources were identified in the summer of 2025. This plan does not guarantee the availability, continuation, or applicability of these sources. All funding sources should be verified for current availability and applicability before pursuing them.

In addition, each solution provides recommendations for the State's role in providing data, technical assistance, permitting support, and cross-agency coordination to accelerate implementation and reduce barriers for municipalities, utilities, port operators, or facility owners.

Taken together, these strategies provide Rhode Island with a pragmatic roadmap for advancing its highest-priority Climate Adaptation & Resilience Solutions.

The following pages detail the recommended:

- **Funding approach**
- **Primary funding mechanisms**
- **State role**

for each of the ten Climate Adaptation & Resilience Solutions.



Road & Bridge Flood Mitigation Solutions with a focus on evacuation routes

Road and bridge flood mitigation strategies are focused on reducing flood damage to roads that cause transportation disruption throughout the state. Strategies include implementing nature-based solutions in rights-of-way, raising emergency access roads, creating flood barriers, and considering roadway rerouting and retreat. Refer to Chapter 5: Climate Adaptation & Resilience Solutions for full strategy descriptions and cost estimates.

Primary Funding Mechanisms:

- USDOT PROTECT Program through RIDOT – Elevation, floodproofing, culvert upgrades, drainage improvement, erosion protection.
- RIIB Municipal Road & Bridge Revolving Loan Fund (MRBRF) – Low-interest financing for municipal transportation upgrades.

Funding Approach

- Use PROTECT funding for major capital segments and evacuation route upgrades.
- Pair MRBRF for match financing and local road components.
- Sequence large federal applications with early engineering supported by MRBRF.

State Role

- Provide statewide flood, hydrology, and risk data to inform PROTECT applications.
- Coordinate with RIDOT on design standards and project eligibility.
- Prepare/Review preliminary flood assessments and provide technical input on roadway elevation and culvert sizing.
- Dedicate continued state funding to MRBRF and ensure resilience criteria are incorporated into project review for this program.



Resilient Port Infrastructure Solutions

Resilient port infrastructure strategies are focused on reducing flooding impacts to limit damage and ensure continual operation of Rhode Island's ports. Strategies include integrating dock and pier system improvements for accessibility, elevating bulkheads and flood barriers, designing hybrid (green- gray) shoreline solutions, and installing energy and backup power systems. Refer to Chapter 5: Climate Adaptation & Resilience Solutions for full strategy descriptions and cost estimates.

Primary Funding Mechanisms:

- Port Infrastructure Development Program (PIDP) – Hardening of bulkheads, piers, docks, power systems, cargo infrastructure.
- NOAA Coastal Zone Management (CZM) Program administered by RI Coastal Resources Management Council, CRMC – Design, permitting, shoreline stabilization, hybrid NBS.
- State Resilience Grants – Including RIIB-MRP Action Grants, RIDEM- Climate Resilience Fund, OSCAR Fund, CRMC, and RIIB – planning, design, construction, and non-federal match for port hardening, shoreline protection, and resilience upgrades.

Funding Approach

- Use PIDP for structural hardening and operational continuity.
- Layer CZM for site assessments and shoreline ecological components.
- Apply OSCAR to strengthen NBS competitiveness and meet match requirements.
- Bundle infrastructure + nature-based components to maximize scoring in federal competitions.
- Use state resilience grants from RIDEM, CRMC, & RIIB for gap funding and non-federal match for federally funded port resilience and infrastructure projects.

State Role

- Coordinate with port operators to align project scopes with statewide resilience priorities.
- Support integration of multi-benefit elements (e.g., NBS + infrastructure hardening) to improve PIDP scoring.
- Ensure alignment with CRMC Shoreline Change SAMPs.
- Provide coastal mapping, habitat data, and climate projections to strengthen competitive federal proposals.
- Continue to fund state resilience grant programs (MRP Action Grants, Climate Resilience Fund, and OSCAR) to support nature-based solutions and matching dollars.



Downed tree on electrical transmission line in Rhode Island © The Providence Journal

Energy Resilience Solutions with a focus on Washington County and Block Island

Energy resilience strategies are focused on reducing flooding and extreme wind impacts to reduce power outages and ensure the reliable delivery of electricity. Strategies include expanding right-of-way area and vegetation management, creating alternative transmission routes, increasing the number of interconnection points, and undergrounding transmission lines in high-risk areas. Refer to Chapter 5: Climate Adaptation & Resilience Solutions for full strategy descriptions and cost estimates.

Primary Funding Mechanisms:

- DOE Grid Resilience and Promoting Resilient Outage Prevention (PROP) – Section 40101(d): Supports utility and community-scale projects that reduce outage frequency and duration through grid hardening, undergrounding, equipment upgrades, interconnection enhancements, vegetation management, and improved system operations.
- RI OER State Energy Program (SEP) – Resilience planning, feasibility, modeling, vegetation management.

Funding Approach

- Use PROP funding for major grid-hardening and capital upgrades such as undergrounding transmission lines, adding redundancy, and creating alternative interconnection routes in high-risk areas including Washington County and Block Island.
- Use SEP implementation funding for planning, feasibility analysis, pre-engineering, and modeling required for PROP-supported projects, including conceptual designs for undergrounding and interconnection expansion.
- Coordinate with utilities to bundle multiple high-risk circuits into a unified proposal, emphasizing system-wide reliability benefits, alignment with state hazard mitigation goals, and reduction in outage frequency and duration.

State Role

- Coordinate with utilities and OER to develop a statewide application and investment strategy for PROP funding, including identifying priority transmission corridors and resilience benefits.
- Provide modeling resources (risk modeling, outage mapping, interconnection analysis).
- Review conceptual designs to ensure alignment with statewide resilience and energy reliability priorities.
- Continue to fund SEP program.



Flooding of Salt Brine in Narragansett, RI © WJAR

Sewer & Stormwater Infrastructure Solutions

Sewer and stormwater infrastructure strategies are focused on reducing flooding impacts to reduce damage to infrastructure and ensure it can remain operable. Strategies include disconnecting infiltration/inflow (i/i) sources, developing green stormwater infrastructure, increasing storm drain capacity, hardening infrastructure in floodplain, stormwater mitigation funding mechanisms, developing nature-based flood storage, removing & disconnecting impervious coverage, and replacing undersized culverts. Refer to Chapter 5: Climate Adaptation & Resilience Solutions for full strategy descriptions and cost estimates.

Primary Funding Mechanisms:

- Clean Water State Revolving Fund (CWSRF) – Pipe replacement, pump station hardening, storm drain capacity, green infrastructure.
- Sewer Overflow & Stormwater Reuse (OSG) – Planning, design, and construction of infrastructure for wastewater and stormwater systems.
- State Resilience Grants – Including RIIB-MRP Action Grants, RIDEM- Climate Resilience Fund, OSCAR Fund, CRMC, and RIIB – Municipal drainage, nature-based stormwater retrofits, hybrid systems. Federal match & technical assistance for resilience upgrades.

Funding Approach

- Apply CWSRF for core sewer/stormwater upgrades, with disadvantaged communities accessing principal forgiveness.
- Use state resilience grants to fund green-infrastructure elements, flood-reduction features, and match requirements.
- Advance engineering reports and sewer assessments using CRF planning grants to strengthen readiness.
- Bundle sewer + roadway flooding + NBS for competitive multi-benefit applications.
- Establishment of stormwater and watershed vulnerability assessment grant fund.

State Role

- Provide technical support during project scoping, including sewer/stormwater assessments.
- Coordinate with municipalities to align stormwater and sewer upgrades across jurisdictions.
- Support preparation of Preliminary Engineering Reports (PERs) required for SRF.
- Promote integration of green infrastructure to meet CRF priorities and improve water-quality outcomes.
- Continue to provide funding for state resilience grant programs such as the CRF.



Wastewater Treatment Facility Hardening

Wastewater treatment facility hardening strategies are focused on reducing flooding impacts to ensure continual operation of the facilities and reduce contamination from runoff, preserving public health. Strategies include installing submersible pumps and ensuring access to backup pumps, redirecting sewage to another wastewater treatment facility, providing wet weather storage, bypass, and disinfection, and relocating facilities, equipment, and sewage. Refer to Chapter 5: Climate Adaptation & Resilience Solutions for full strategy descriptions and cost estimates.

Primary Funding Mechanisms:

- Clean Water State Revolving Fund (CWSRF) – Floodproofing, process resiliency, pump upgrades, structural hardening.
- Rhode Island Voter-Approved Green Bonds / Municipal Revenue Bonds – Large capital components (structural upgrades).
- State Resilience Grants – Including RIDEM & RIIB WWTF Resilience Fund – Planning, design, construction, and non-federal match for wastewater treatment facility flood mitigation and operational continuity improvements.

Funding Approach

- Provide continued green bond funding for the previously established RIDEM & RIIB WWTF Resilience Fund.
- Use CWSRF as financing tool for hardening and treatment reliability upgrades.
- Identify opportunities for principal forgiveness under provisions for Green Project Reserve (GPR).
- Combine bond financing + SRF for a blended, low-cost funding package.

State Role

- Verify Bond eligibility for WWTF resilience upgrades.
- Review project scopes to meet SRF eligibility and environmental compliance requirements.
- Help municipalities navigate CWSRF application processes, including match strategies.



Scituate Reservoir © John Mernick for Shutterstock

Drinking Water & Reservoir Resilience

Drinking water and reservoir resilience strategies are focused on reducing flooding and extreme heat impacts to Rhode Island's drinking water reservoirs, ensuring both quantity and quality of potable water. Strategies include restoring vegetated riparian buffers, enhancing existing emergency spillways, improving embankments, and building a desalination plant. Refer to Chapter 5: Climate Adaptation & Resilience Solutions for full strategy descriptions and cost estimates.

Primary Funding Mechanisms:

- RIIB Drinking Water State Revolving Fund (DWSRF) – Spillway upgrades, watershed management, treatment protection, embankment reinforcement; possible principal forgiveness for disadvantaged communities.
- NOAA Coastal Resilience Grants – For coastal-influenced reservoir areas needing nature-based buffers.
- Rhode Island Voter-Approved Green Bonds - Capital investments for watershed protection, embankment reinforcement, and emergency spillway enhancements at publicly owned drinking water reservoirs.

Funding Approach

- Use DWSRF for all engineered components (spillways, embankments, structural protections).
- Pair with NOAA for watershed or shoreline stabilization and nature-based water-quality protection.
- Pursue early engineering reports with RIIB technical assistance.
- Use match-eligible watershed partners (universities, NGOs) for NOAA co-applications.
- Use Rhode Island voter-approved Green Bonds to fund capital reservoir and watershed resilience investments and to provide required non-federal match for complementary federal programs.
- Establish Drinking Water Resiliency Fund.

State Role

- Provide guidance on DWSRF project eligibility and support completion of preliminary engineering reports.
- Help identify opportunities for principal forgiveness for disadvantaged communities.
- Coordinate with CRMC to provide consistency determinations for coastal-influenced reservoirs.
- Provide technical data on algal blooms, runoff pollution, and saltwater intrusion risks.



Beach & Wetland System Restoration

Beach and wetland system restoration strategies are focused on reducing coastal flooding impacts to conserve and protect these natural systems, as well as the built environment around them. Strategies include enhancing dynamic dunes and barriers, restoring wetlands and buffer zones, and implementing a pilot voluntary buyout program. Refer to Chapter 5: Climate Adaptation & Resilience Solutions for full strategy descriptions and cost estimates.

Primary Funding Mechanisms

- National Coastal Wetlands Conservation Grants (NCWCG) – Habitat restoration, coastal buffers, dune enhancement.
- Natural Resources Conservation Service PL 566 – Flood damage reduction, shoreline stabilization, dune and barrier protection, and small watershed restoration projects.
- Emergency Watershed Protection (EWP) Program – Post-disaster stabilization of dunes, wetlands, and streambanks; erosion control and flood-damaged natural infrastructure repair.
- State Resilience Grants – Including RIDEM OSCAR Fund, and RIB Climate Resilience Fund and MRP – Nature-based coastal resilience in vulnerable shoreline zones.

Funding Approach

- Use NCWCG for large-scale wetland restoration or acquisition activities.
- Continue to fund state resilience grant programs that can support this work, and launch new voluntary buyout funding program with acquisition criteria and procedures developed with RIDEM's Land Acquisition Committee.
- Apply OSCAR for match funding and NBS construction.
- Bundle dune restoration + marsh enhancement + erosion control in regional proposals.

State Role

- Provide habitat data, coastal mapping, and climate projections to bolster NCWCG applications.
- Coordinate with DEM and CRMC to confirm eligibility of restoration sites and required match commitments.
- Prioritize state-identified restoration zones (e.g., low terrestrial resilience, high erosion).



River and Stream Restoration with a focus on the Moshassuck River

River and stream restoration strategies are focused on reducing flooding and heat impacts to protect habitats and enhance ecosystems. Strategies include improving water quality with green infrastructure, reconnecting floodplains, restoring wetland function, and improving watershed hydraulics. Refer to Chapter 5: Climate Adaptation & Resilience Solutions for full strategy descriptions and cost estimates.

Primary Funding Mechanisms

- State Resilience Grants – Including RIIB MRP, RIDEM Climate Resilience Fund, and OSCAR Fund – Stormwater improvements, nature-based flood mitigation, hydraulic upgrades, inland water area restoration and watershed planning.
- EPA SNEP Watershed Implementation Grants (SWIG) – Floodplain reconnection, wetland restoration, stormwater controls, green infrastructure.

Funding Approach

- Apply CRF for localized stormwater retrofits and match-eligible components.
- Develop multi-municipal watershed coalitions to strengthen federal scoring.
- Establish stormwater and watershed vulnerability assessment grant fund.
- Use SNEP SWIG to supplement watershed-scale restoration and green-infrastructure projects.

State Role

- Provide technical assistance & funding to local municipalities for watershed planning and identification of best placement for solutions.
- Help applicants align projects with statewide watershed priorities.
- Provide guidance on CRF, MRP, and OSCAR scoring criteria and eligible project types.
- Assist municipalities in identifying regional watershed partners (universities, watershed councils, NGOs).
- Continued funding for state resilience grant programs.



School & Public Safety Building Solutions with hardening and relocation opportunities

Strategies are focused on reducing flooding, extreme heat, and extreme wind impacts to ensure community and emergency service providers can continue to serve Rhode Island. These include relocating programming out of flood zones, elevating critical infrastructure, retrofitting with floodproofing principles, and creating a resilience hub or microgrid. Refer Chapter 5: Climate Adaptation & Resilience Solutions for full strategy descriptions and cost estimates.

Primary Funding Mechanisms

- USDA Community Facilities Grant/Loan Program – School retrofits, fire station resilience upgrades, emergency facility relocation.
- Municipal Resilience Program (MRP) – Building storm proofing, system elevation, green infrastructure, resilience hubs.
- State Bonds (as needed) – For large capital projects or relocations.

Funding Approach

- Use USDA for essential service facilities in eligible communities (schools, EMS, fire stations).
- Use MRP for resilience hub design, storm proofing, and building system elevation.
- Combine USDA + MRP to reduce local share for major projects.
- Consider bond financing if full facility reconstruction is required.

State Role

- Confirm “essential community facility” eligibility for USDA funding.
- Provide technical guidance on relocation planning, site assessment, and risk-reduction benefits.
- Support municipalities through MRP workshops to identify priority retrofit or hub projects.



Hospital Flood & Energy Resilience Solutions

Hospital flood and energy resilience solutions are focused on reducing flooding, extreme heat, and wind impacts. Strategies include conducting a multi-hazard mitigation planning effort, making comprehensive floodproofing and façade enhancements, enacting emergency access protective measures, and creating microgrids. Refer to Chapter 5: Climate Adaptation & Resilience Solutions for full strategy descriptions and cost estimates.

Primary Funding Mechanisms

- USDOT PROTECT Program – Floodproofing emergency access routes and transportation connections.
- USDOE State Energy Program (SEP) – Microgrids, renewable backup power, energy storage, energy reliability improvements.

Funding Approach

- Use PROTECT to upgrade access roads, ambulance routes, parking drainage, and floodproofing of transport connections.
- Use SEP for hospital-based microgrids, backup battery systems, and clean-energy resilience projects.
- Build a combined PROTECT + SEP package to address both access and operational continuity.
- Engage OER early for technical assistance and match planning.

State Role

- Assist hospitals and municipalities in aligning PROTECT proposals with statewide transportation resilience goals.
- Provide hazard and flood mapping data to support design/scoping of access-route improvements.
- Provide technical assistance on microgrid design and energy-resilience modeling through OER.
- Coordinate feasibility assessments for battery storage, backup generation, and clean-energy pathways.
- Support hospital coordination and prioritization based on bed count, regional service role, and life-safety implications.
- Continue to fund SEP.

3. Funding Strategy Framework

3a - A Framework for Prioritizing Resilience Solutions

3b - Funding & Financing Mechanisms

3c - Economic Impact Assessment of Investment in Resilience Infrastructure

3a - A Framework for Prioritizing Resilience Solutions

Rhode Island's climate resilience priorities extend beyond the 10 representative solutions described above. This Plan therefore includes to provide a defensible, transparent, and equitable roadmap to support state and local climate leaders systematically evaluate other candidate assets and projects. For more information on the prioritization process used to identify priority assets for solution development included in this plan, see Chapter 4: Priority Assets List.

Approach

The process below outlines how the State and local leaders can employ the Prioritization Framework to continue planning for and beyond the 10 priority solutions and priority assets.

Step 1: Apply the **Asset Prioritization Framework** Criteria to Vulnerable Assets

Step 2: Apply the **Project Prioritization Framework** to Priority Assets

Step 3: Match High-Priority Projects to Available **Funding Mechanisms**

Step 4: Define the State's Specific **Support Role** for Each Project

Step 1: Apply the Asset Prioritization Framework Criteria to Vulnerable Assets

Climate leaders can begin by evaluating vulnerable assets using the Asset Prioritization Framework. This framework has been developed to be applicable across sectors to identify those with the greatest statewide benefit. Full details on the framework, including working definitions for Low–Medium–High scoring for each criterion, are provided in Chapter 8: Prioritization Framework.

For more information on the prioritization process used in this plan, see Chapter 4: Priority Assets List.

Criteria		Working Definition
<p>Need: How vital an asset is to the safety, stability, and functioning of interconnected systems or sectors.</p>	N1	Life Safety The extent to which damage to the asset would result in health and wellness impacts.
	N2	Urgency The extent to which the asset is already experiencing climate impacts.
	N3	Criticality The extent to which other systems or sectors depend on the asset. A highly critical asset may cause cascading failures across multiple systems if disrupted.
	N4	Redundancy The extent to which the asset creates additional capacity or alternative service delivery during a climate event.
	N5	Number of People Impacted The number of people, including residents and workers, which the asset serves or protects.
<p>Equity and Community Support: Whether an asset serves or protects vulnerable populations, aligns with community priorities, promotes environmental justice, and protects economic opportunities.</p>	E1	Supports Vulnerable Populations The extent to which the asset serves communities with high Social Vulnerability Indices.
	E2	Community Supported The extent to which the asset is important to the local community.
	E3	Advances Environmental Justice The extent to which the asset serves and/or reduces environmental burdens on historically underserved communities.
	E4	Protects Economic Resources The extent to which an asset protects economic resources.
<p>Strategic Alignment: How well an asset aligns with broader municipal, regional, or resilience planning goals, including comprehensive and hazard mitigation planning efforts.</p>	S1	Alignment with Local/Municipal Goals The extent to which the asset aligns with local and municipal goals.
	S2	Identified in Multiple Planning Initiatives The extent to which the asset is listed as a priority asset in planning initiatives, such as Hazard Mitigation Plans.
<p>Holistic Resilience: Whether an asset contributes to long-term environmental, cultural, and social well-being beyond its primary function.</p>	H1	Advances or Protects Biodiversity The extent to which the asset enhances and protects biodiversity.
	H2	Provides Ecosystems Services or Co-Benefits The extent to which the asset improves the ecosystems more broadly, such as improving air and water quality.
	H3	Supports Sustainability Goals or Initiatives The extent to which the asset reduces greenhouse gas (GHG) emissions, sequesters carbon, or can support decarbonization efforts.
	H4	Carries Cultural or Historical Value The extent to which the site is an active cultural or historical site.

Step 2: Apply the Project Prioritization Framework to Priority Assets

After developing project concepts for the highest-priority assets identified in Step 1, climate leaders can use the Project Prioritization Framework to evaluate and rank these projects. This framework helps determine which concepts should advance first based on feasibility, impact, and alignment with statewide resilience goals. The outcome should be a ranked list of project concepts that can guide investment decisions and inform the next phase of implementation.

Criteria		Working Definition	
Cost Factors: Captures the overall financial commitment required to implement and sustain the project.	C1	Initial Capital Costs	The magnitude of upfront financial resources required to initiate the project, including design, permitting, and construction start-up expenses.
	C2	Ongoing Costs	The degree of recurring financial commitment required to operate, maintain, and monitor the project after completion.
	C3	Cost of Doing Nothing	The financial, social, and operational risks associated with inaction—specifically, the cost of damages, service disruption, and lost productivity or wellbeing if the project is not implemented.
	C4	Potential Economy of Scale	Potential cost efficiencies, resource sharing, or performance improvements that can be realized by implementing multiple related projects together or at a larger scale.
Impact: Reflects the extent to which the project benefits people and businesses in the broader community.	I1	Impacted Populations	The extent to which the project benefits or affects individuals within the community, measured by reach, safety, or accessibility. In addition to the extent to which community members will be engaged.
	I2	Economic Resilience and Business Impact	The degree to which the project influences economic activity through improved infrastructure, access, or resilience.
	I3	Number of Assets and Services Impacted	The extent to which the project benefits or affects other assets essential to Rhode Island's resilience.
	I4	Ecosystem Health and Environmental Resilience	The degree to which the project protects, restores, or enhances natural ecosystems and their capacity to provide essential services — such as water filtration, flood mitigation, habitat support, and carbon sequestration.
Lifespan: Indicates how long the investment will deliver value and remain functional without major reinvestment or degradation.	S1	Longevity of Investment	The degree to which the project delivers long-term, durable benefits that reduce the need for future interventions.
Implementation and Maintenance Feasibility: Measures the ease of successful implementation based on funding availability, organizational capacity, and project complexity.	F1	Funding Source	The availability, reliability, and eligibility of funding sources to support project implementation and maintenance.
	F2	Leading Entity	The degree to which a specific organization or agency is identified and prepared to manage project implementation and maintenance.
	F3	Complexity	The level of technical, regulatory, and logistical difficulty associated with implementing the project.
	F4	Adaptability	The project's capacity to accommodate changing conditions, future climate hazards, technologies, or future expansion.

Step 3: Match High-Priority Projects to Available Funding Mechanisms

After establishing the rankings, climate leaders should identify which funding mechanisms best align with each project's needs listed on the following pages and in Chapter 7: Funding & Financing Mechanisms Inventory, using the guidance herein and assigned to each *Resilient Rhody 2025* Action and Climate Adaptation & Resilience Solution. This process is as follows:

- Identify which federal grants, state funding programs, and low-interest loan mechanisms each project may qualify to receive
- Determine which interventions require upfront technical assistance—such as CZM for shoreline permitting or SEP for microgrid feasibility
- Clarify the funding sequence for each project phase (e.g., planning → design → construction)
- Develop match strategies that leverage municipal bond capacity, state funds (e.g., CRF, OSCAR, MRP), or SRF principal forgiveness

Continue to the following pages for list of potential funding and financing mechanisms.

Step 4: Define the State's Specific Support Role for Each Project

For each prioritized project, the State should outline its support functions such that implementing partners clearly understand what assistance will be provided.

The State's role commonly includes:

- Providing unified datasets (climate, flood, coastal, ecological, and outage data)
- Delivering engineering, modeling, and feasibility support
- Verifying funding eligibility and aligning project scopes with statewide plans and priorities
- Coordinating multi-agency review, permitting steps, and regulatory compliance
- Supporting grant applications, including match planning, cost-benefit inputs, and technical documentation
- Strengthening municipal readiness through workshops, templates, and direct technical assistance
- Helping identify and secure match funding from state programs or bond structures
- Ensuring regulatory alignment for coastal, water, energy, and transportation projects
- Embedding equity by prioritizing investments in socially vulnerable communities
- Continuing to support state resilience funding & financing programs

Refer to the State roles assigned to the 10 priority solutions outlined in this plan for guidance on the types of roles that may be relevant to different project types.

Equitable Investment Considerations

Equitable investment is a central consideration within these solutions, as many high-risk stormwater, drinking water, school, and community facilities are located in socially and economically vulnerable areas. Ensuring that investments reduce disproportionate flood and environmental health risks, maintain access to essential services, and lower participation barriers for underserved municipalities is therefore a core component of this strategy. Please refer to Chapter 8: Prioritization Framework which provides example metrics to assess whether assets and projects serve vulnerable areas.

3b - Funding and Financing Mechanisms

*Rhode Island's Evolving Funding Approach*⁸

Initially, Rhode Island supported resilience projects solely through grant funding. Rhode Island's Municipal Resilience Fund is the capital deployment arm of the state's broader Municipal Resilience Program. The program begins with a structured, collaborative risk assessment and planning process in which municipalities receive support to identify and prioritize locally relevant resilience projects. This is an essential first step for smaller or under-resourced jurisdictions, as they may not have in-house climate planning capacity. Thus, the program is designed for more equitable delivery, not just scaled delivery, of vital capital.

This approach succeeded at promoting resilience planning on a small scale. However, as demand grew and project size increased, it became clear that a more durable, sustainable financing method was needed. In response, the Rhode Island Infrastructure Bank shifted toward a loan model through the Resilient Rhody Infrastructure Fund (RRIF), using its experience managing state revolving funds to offer long-term, low-cost capital. On a conservative basis, every \$1 in public resources can now support \$3 in project costs. This turns a finite pool of funds into a self-renewing and significantly more powerful platform to meet mounting demand.

Once projects are ready for implementation, the Rhode Island Infrastructure Bank can now provide funding through a mix of revolving loan capital, state bond proceeds, green bonds, and federal infrastructure funding. The result is a layered sustainable financing model that does not rely on a single funding source. Among other strengths, this model enables small cities and towns to punch above their fiscal weight, accessing both capital and expertise without needing to master the complex mechanics of resilience finance.

Funding and Financing Mechanisms

To support the implementation of *Resilient Rhody 2025* Actions, a comprehensive inventory of funding mechanisms was developed and mapped to each Action and the 10 solutions outlined herein. The potential funding sources for these Actions are organized into three categories: federal funding, state funding, and non-traditional funding and include the following. Summaries and applicable hazards of the mechanisms listed below are available in Chapter 7: Funding & Financing Mechanisms Inventory. **All funding sources should be verified for current availability and applicability before pursuing them.**

⁸ Adapted from: Muro, M., & Kammen, D. (2024, October 31). *Rethinking our assumptions and financing tools for community resilience in the face of growing climate loss and risk*. Brookings. <https://www.brookings.edu/articles/rethinking-our-assumptions-and-financing-tools-for-community-resilience-in-the-face-of-growing-climate-loss-and-risk/>

Federal Funding Sources*

**Federal funding sources were identified in the summer of 2025. This plan does not guarantee the availability, continuation, or applicability of these sources.*

Environmental Protection Agency (EPA)

- Brownfields Program
- National Estuary Program (Narragansett Bay Estuary)
- Section 319 Nonpoint Source Grant Program
- Sewer Overflow & Stormwater Reuse (OSG)
- SOAR Fund (Opportunity to Advance Resilience)
- Southeast New England Program (SNEP) Watershed Implementation Grants (SWIG)
- Water Infrastructure Finance and Innovation Act (WIFIA)
- Wetland Program Development Grants (WPDG)

Federal Emergency Management Agency (FEMA)

- Emergency Management Performance Grant (EMPG)
- Flood Mitigation Assistance (FMA) Grant Program
- National Dam Safety Program

National Oceanic and Atmospheric Administration (NOAA)

- Coastal Zone Management (CZM) Program
- Environmental Literacy Program
- Rhode Island Sea Grant Program
- National Coastal Resilience Fund (NCRF)

U.S. Department of Agriculture (USDA)

- Community Facilities Direct Loan & Grant Program
- Emergency Watershed Protection (EWP) Program
- Forest Service Forest Legacy Program
- Forest Service Urban and Community Forestry Grants
- Natural Resources Conservation Service (NRCS) Incentives
- Rural Development Energy Programs (REAP)
- Rural Development Technical Assistance
- Rural Development Training Programs
- Rural Development Water Programs
- Urban and Community Forestry Grant Program
- Watershed and Flood Prevention Operations Program (PL-566)

U.S. Department of Defense (DOD)

- Installation Readiness Program
- Office of Local Defense Community Cooperation Programs
- Readiness and Environmental Protection Integration Program (REPI)

U.S. Department of Transportation (DOT)

- Congestion Mitigation and Air Quality Improvement Program
- Port Infrastructure Development Program (PIDP)
- PROTECT Grant Program
- Transportation Alternatives Set Asides
- Wildlife Crossings Pilot Program (WCPP)

U.S. Army Corps of Engineers (USACE)

- Continuing Authorities Program

Other Federal Funding

- Five Star and Urban Waters Restoration Grant Program
- HUD Community Development Block Grant (CDBG)
- HUD PRO Housing Grant Program
- HUD Section 108 Loan Guarantee Program
- Centers for Disease Control and Prevention (CDC) – Climate-Ready States and Cities Initiative (CRSCI)
- Historic Preservation Fund (HPF)
- U.S. Department of Health & Human Services (DHHS) – Low Income Home Energy Assistance Program (LIHEAP)
- U.S. Department of Energy (DOE) – State Energy Program (SEP)
- U.S. Fish and Wildlife Service – State Wildlife Grants

State Funding Sources

Rhode Island Infrastructure Bank (RIIB)

- Resilient Rhody Infrastructure Fund
- Municipal Resilience Program (MRP)
- Municipal Infrastructure Grant Program (MIGP)
- Clean Water State Revolving Fund (CWSRF)
- Drinking Water State Revolving Fund (DWSRF)
- DWSRF Administration & Technical Assistance Set-Aside
- DWSRF Small Systems Technical Assistance Set-Aside
- DWSRF State Program Management Set-Aside
- Stormwater Project Accelerator (SPA)
- Efficient Building Fund (EBF)
- Municipal Road & Bridge Revolving Loan Fund (MRBRF)
- Commercial Property Assessed Clean Energy (C-PACE)
- Community Project Assistance Fund (CPAF)

Rhode Island Department of Environmental Management (RIDEM)

- RI Climate Resilience Fund (CRF)
- Bay and Watershed Restoration Fund
- State Land Conservation Program
- Local Open Space Grants
- Wastewater Treatment Facility Resilience Fund (RIDEM & RI Infrastructure Bank – RIIB)
- Ocean State Climate Adaptation & Resilience Fund (OSCAR) (RIDEM & RI Coastal Resources Management Council – CRMC)

Rhode Island Office Of Energy Resources (OER)

- Energy Resilience & Emergency Planning
- Regional Greenhouse Gas Initiative (RGGI) (RIDEM)
- Renewable Energy Fund (REF) & Resilient Microgrids for Critical Services Program
- State Clean Energy Programs & Power System Transformation Coordination

Additional State Programs

- RI Green Economy and Clean Water Bonds (State of RI)
- Site Readiness Grant Program (RI Commerce)
- RI Department of Transportation Capital Improvement Program (RIDOT)
- Coastal and Estuary Habitat Restoration Program & Trust Fund (RI CRMC)
- Resilience Technical Assistance Program (RI Department of Administration – Division of Statewide Planning)
- Rebounds Energy Efficiency Grant Program (RI Department of Commerce)

Non-Traditional Funding Sources

- Tax Increment Financing (TIF)
- Special Assessment Districts
- Developer Impact Fees / Resilience Exactions
- Transfer of Development Rights (TDR)
- Catastrophe / Resilience Bonds
- Blue Bonds
- Environmental Impact Bonds
- Dedicated Utility Fees
- Community-Based Public-Private Partnerships (CBP3)
- Parametric Insurance
- Insurance Premium Discounts
- Thriving Communities Grantmaking Program (Environmental Justice for New England)

Refer to Chapter 2: *Resilient Rhody 2025* Actions and Chapter 5: Climate Adaptation & Resilience Solutions for a detailed overview of the recommended funding mechanisms mapped to each priority.

3c - Economic Impact of Resilience Infrastructure Construction

This section presents an economic impact analysis of public investment in resilience-related construction and infrastructure in Rhode Island. The analysis establishes a rule of thumb for estimating the economic multiplier effects of direct spending on climate resilience projects, which can be scaled to projects of varying sizes. The figures presented reflect jobs created, wages paid, and economic activity generated through the construction process itself.

This analysis measures the economic impact of construction spending, *not* the benefits of enhanced resilience. This analysis does not quantify the additional and substantial long-term benefits of climate resilience, including:

- Avoided damages to property, infrastructure, and natural resources
- Prevented economic disruptions and business losses
- Reduced emergency response and repair costs
- Protected tax revenues from maintained property values and economic activity
- Lives saved and reduced health impacts
- Ecosystem services and environmental co-benefits
- Enhanced economic capacity and competitiveness

The economic impact analysis was conducted using Lightcast economic modeling software, which accounts for direct, indirect, and induced effects of construction spending through input-output modeling. The analysis examines the impact of \$1 million in direct construction spending related to resilience infrastructure in Rhode Island's economy.

Overall Economic Impact

This process found that for every \$1 million invested in resilience-related construction in Rhode Island generates approximately \$1.56 million in total economic output (sales), supporting 7 jobs during the period of construction and producing \$625,000 in earnings across the state economy.

Economic Impact of \$1M in Construction Spending in Rhode Island

	Jobs	Earnings	Sales
Direct	4	\$408,993	\$1,000,000
Indirect	1	\$69,951	\$204,847
Induced	2	\$145,722	\$358,246
Total	7	\$624,666	\$1,563,093

Source: Lightcast

The impact breaks down as follows:

- **Direct Effects:** The initial \$1 million investment directly supports 4 jobs with \$409,000 in earnings within the construction sector itself.
- **Indirect Effects:** Supply chain impacts generate an additional \$205,000 in sales, supporting 1 job and \$70,000 in earnings as construction firms purchase materials, equipment, and services from Rhode Island suppliers.
- **Induced Effects:** Household spending by workers employed through direct and indirect effects generates \$358,000 in additional sales, supporting 2 jobs and \$146,000 in earnings as these workers spend their income in the local economy.

Economic Multiplier

The analysis yields an **output multiplier of 1.56**, meaning each dollar of direct construction spending generates an additional \$0.56 of economic activity through indirect and induced effects. This multiplier reflects the interconnected nature of Rhode Island's economy and the broad economic benefits of resilience infrastructure investment.

Application

This rule of thumb can be applied to resilience construction projects of any scale by multiplying the project's direct construction investment by the appropriate impact factors. For example, a \$10 million resilience project would be expected to generate approximately 70 jobs, \$6.2 million in earnings, and \$15.6 million in total economic output across Rhode Island.

Investment in resilience infrastructure delivers substantial economic returns beyond its primary purpose of climate adaptation. The multiplier effects demonstrate that such investments serve dual purposes: enhancing Rhode Island's capacity to withstand climate impacts while simultaneously supporting job creation, income growth, and broad-based economic development across multiple sectors of the state economy.

Construction spending on resilience infrastructure generates measurable near-term economic activity through job creation, supply chain spending, and induced household purchases. However, the primary economic justification for these investments lies in their long-term benefits: avoiding damages that could total hundreds of millions of dollars, preventing economic disruptions, protecting lives and public health, maintaining essential services, and preserving Rhode Island's economic competitiveness. A comprehensive cost-benefit analysis quantifying these avoided costs and long-term benefits would provide a fuller picture of the economic returns from resilience investments.

A \$340 million investment in resilience-related construction in Rhode Island could:

- Generate approximately **\$530.4 million in total economic output.**
- Support roughly **2,380 jobs.**
- **Produce \$212.5 million in earnings** across the state economy.

Appendix A: Implementation Framework Tags Descriptions

Funding

Funding – Require access to support and dedicated financial resources, including support for grant writing, match requirements, or direct application to federal, state, or philanthropic funding streams. It may also highlight the need to establish new funding mechanisms or expand existing state-level programs.

Community Incentives – Programs or policy tools that encourage voluntary resilience actions by residents, businesses, or property owners. Examples include tax abatements for floodproofing, rebates for green infrastructure, or fast-tracked permitting for resilient construction. These incentive structures are critical for fostering a culture of shared responsibility and expanding the reach of state-led programs through private action.

Direct Government Investment & Procurement – Using government purchasing power and capital investments to drive resilient infrastructure, green procurement policies, or direct public works projects that model climate-resilient practices. This tag applies to actions that require public-sector capital investments, such as infrastructure upgrades, resilient retrofits, or the acquisition of emergency systems, or modifications to procurement processes that prioritize climate-smart practices.

Policy and Compliance

Land Use Policy – Changes to zoning, building codes, or land use planning needed to support resilient development, open space preservation, or managed retreat. Actions under this category often require changes that enable green infrastructure, floodplain protections, managed retreat strategies, or the preservation of open space to buffer against climate hazards.

Rules & Regulations – Regulatory updates needed at the local, state, or federal level to remove barriers or mandate climate-resilient practices. This may include revising stormwater rules, building performance standards, or permitting requirements. In many cases, new or updated regulations are necessary to ensure consistency, enforceability, and the effectiveness of long-term resilience measures across jurisdictions.

Enforcement & Compliance Mechanisms – Creating oversight systems, inspection protocols, penalties, or compliance monitoring for existing or new climate resilience requirements. Effective enforcement not only increases accountability but also drives long-term performance and risk reduction.

Tools & Training

Data Collection & Information Systems – Creating requirements for data gathering, standardized reporting, monitoring systems, or information sharing platforms that support resilience decision-making across sectors. These systems are critical for understanding risk, prioritizing investments, and demonstrating impact over time.

Technical Assistance & Capacity Building – Establishing government programs to provide technical expertise, professional development, or direct support services to help communities, businesses, or other agencies implement resilience measures. Building capacity ensures that stakeholders have the tools, knowledge, and resources to execute resilience strategies effectively and equitably.

Education, Engagement, & Awareness – Public education campaigns, technical training, or stakeholder engagement efforts required to build support or understanding of climate resilience. This tag signals the need for outreach campaigns, community workshops, or capacity-building sessions that help the public and local officials make informed decisions. It also highlights the importance of transparency and two-way communication in fostering trust and empowering residents to act.

Coordination

Intergovernmental Coordination – Establishing formal mechanisms for collaboration between state, federal, and local governments, including compacts, regional authorities, or mandated coordination protocols for climate resilience planning. This tag refers to the need for formal coordination mechanisms, such as joint task forces, interagency working groups, or regional compacts, that align goals, share data, and streamline implementation.

Public-Private Partnership Frameworks – Establishing legal structures and policies that facilitate collaboration between government and private sector for resilience investments, risk-sharing arrangements, or innovative financing mechanisms. These structures can be vital for scaling up infrastructure projects, leveraging private capital, and aligning business incentives with resilience outcomes.

Emergency Preparedness & Response Authorities – Developing special governmental authorities for climate emergencies, including streamlined permitting during disasters, emergency procurement, or evacuation/relocation authorities. This tag indicates the need for enabling policies that expand emergency powers during disasters to strengthen these authorities, reducing response times and improving outcomes.

Appendix B: Comparative State Climate Resilience Investments

Comparative State Climate Resilience Investments

To inform Rhode Island's resilience funding strategy, this analysis reviews budget allocations in neighboring and peer states to provide context on the scale and structure of climate resilience investments in the region.

Delaware

Delaware, the lowest-lying state in the nation with a population of approximately 1.0 million, allocated \$15 million in October 2024 for a state-funded coastal shoreline resilience project to reinforce shorelines and prevent damage to coastal infrastructure. The State also operates the Resilient Community Partnership program, which provides technical assistance and potential funding to municipalities for coastal hazard planning, leveraging federal NOAA grants (specific annual amounts not publicly disclosed). This state's approach emphasizes leveraging federal partnerships for technical assistance while making strategic state investments in critical coastal infrastructure.

Maryland

Maryland, with a population of 6.2 million and over 3,190 miles of tidal shoreline, has established one of the most comprehensive and transparent resilience funding programs in the region. The Chesapeake and Atlantic Coastal Bays Trust Fund awarded \$29 million in FY2026 to 27 ecological restoration projects across 160 sites. These projects deploy best management practices including stream restoration, living shorelines, wetland creation, and stormwater management.

The state's FY2026 budget includes a \$24 million Waterway Capital Appropriation and over \$97 million allocated to the Department of Natural Resources' Watershed and Climate Services division for operations and capital projects. Additional resilience investments include \$415,000 for climate resilience planning and design projects and \$248,480 for Resiliency through Restoration implementation projects. Maryland also secured \$15.2 million in federal NOAA Climate-Ready Coasts funding in 2023 for four projects including wetland restoration and marine debris education.

Massachusetts

Massachusetts has established the most systematic approach with a targeted commitment to dedicate 1% of its total state budget to energy and environmental programs. In FY2026, this translated to approximately \$547 million annually from its \$60.9 billion budget. Key resilience line items include the Municipal Vulnerability Preparedness (MVP) Action Grant program (\$52.4 million in August 2024), a Disaster Relief and Resilience Fund (\$25 million capitalization including \$14 million from consolidated net surplus and \$11 million in seed funding), and \$2.8 million for dams, culverts, and small bridges. Massachusetts has doubled municipal climate resilience funding and increased capital funding to state agencies sevenfold since 2023, establishing a predictable funding floor through its policy-driven 1% budget commitment.

Connecticut

Connecticut allocates climate resilience funding primarily through competitive grant programs and bond authorizations within its biennial budget structure. The state's DEEP Climate Resilience Fund grew from \$8.8 million in its 2023 inaugural round to \$44.8 million for FY2025 (\$33 million state funds, \$11.8 million federal), with at least 40% prioritized for vulnerable and environmental justice communities. Additional resilience investments include \$25 million (FY2024) and \$22.5 million (FY2025) for dam repair, flood control, and erosion repair. Connecticut authorized a Climate Resiliency Revolving Loan Fund in 2024 (bond-funded, specific amount to be determined) and allocated \$275 million in bond funding for the Clean Water Fund in June 2024 to provide municipal loans. Connecticut's approach emphasizes leveraging state funds to unlock federal matching dollars while using bond authorizations for major infrastructure investments.

Maine

Maine focuses on direct municipal support through its Community Resilience Partnership, which awarded \$8 million in its fifth round in May 2025, bringing total program funding to \$18.8 million distributed across 263 communities since inception. The program is funded through a combination of \$5 million from FY2024 state supplemental appropriations, \$3 million from FY2023 legislative appropriations and federal NOAA grants, with maximum awards increased from \$50,000 to \$75,000 per community and up to \$175,000 for joint applications. Following devastating winter storms in 2023-24 that caused approximately \$90 million in infrastructure damage, Maine allocated a historic \$60 million for infrastructure rebuilding and resilience.

The state operates the Maine Infrastructure Adaptation Fund (MIAF), which provided \$1.4 million to 19 communities in FY2024 following its initial \$20 million capitalization in FY2022 that supported 12 communities. Maine also maintains a \$4 million annual Municipal Stream Crossing Program. The state secured \$69 million in federal NOAA Climate Resilience Regional Challenge funding (October 2024-2029) and \$6.6 million for the Maine Grid Resilience Grant Program. Maine's approach demonstrates how direct municipal grants combined with strategic emergency capital investments can address both ongoing resilience needs and acute climate-driven disasters.

Key Takeaways for Rhode Island

Successful state strategies combine three elements: (1) recurring programmatic funding through annual budget line items establishing predictable grant programs; (2) one-time capital investments responding to major climate events or addressing critical infrastructure vulnerabilities; and (3) strategic use of state funds to unlock federal matching dollars through State Revolving Funds, NOAA programs, and EPA partnerships. Most states have established dedicated resilience funds with competitive application processes rather than distributing funds through general appropriations, allowing for transparent project selection based on measurable impact criteria such as cost-effectiveness, equity considerations, and pollution reduction outcomes.

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Appendix C: Resources Used to Inform Funding Need Estimates

Below is a list of resources used to inform Action Funding Needs estimates. These sources are in addition to the research done for the individual funding programs included in the funding inventory document.

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